

CA 24N

23

-77E03

Government
Publications

3 1761 11849460 8

CANADIAN BANKING TECHNIQUES

Working Paper #3

Professor Richard H. McLaren
Project Director

Ontario *M*acmillan publication

CAZON
Z 3
-77E03

CANADIAN BANKING TECHNIQUES

Working Paper #3

Professor Richard H. McLaren
Project Director

This background paper is one of a series which has been developed in connection with a research project directed by Professor Richard H. McLaren. It is directed at identifying specific issues within a designated topic. The research project was designed to identify the "Policy and Legislative Responses to Electronic Funds Transfer" from a provincial perspective.



Digitized by the Internet Archive
in 2024 with funding from
University of Toronto

<https://archive.org/details/31761118494608>

TABLE OF CONTENTS

	<u>PAGE</u>
INTRODUCTION -----	1
1. <u>DEPOSIT CLEARING FACILITIES</u> -----	2
(a) Automatic Payroll Depositing -----	5
(b) Direct Deposit of Interest -----	7
(c) Pre-Authorized Debits -----	8
2. <u>ON-LINE BANKING</u> -----	13
(a) Cash Dispensers -----	17
(b) Automatic Teller Services -----	20
3. <u>CREDIT CARDS</u> -----	25
(a) Credit Authorization Networks -----	29
(b) Point of Sale Terminals -----	32
CONCLUSIONS -----	34
FOOTNOTES	

INTRODUCTION:

The purpose of this study is to provide background information on the present practices and techniques of banking in vogue amongst the Canadian chartered banks. There is very little public information concerning these techniques. This study is intended to provide a descriptive model of present practices. It has been compiled from extensive interviews conducted by various members of the research team.

What emerges from this study is a distinct impression that Canadian banking techniques are in a state of transition from mechanization to automation. The process of change during this transition stage is appreciably accelerating. It appears that the major changes in techniques described in this paper are the forerunner of the techniques necessary to developing the capacity for electronic funds transfer.

Up until the early 1970's, the banks' development of techniques or systems was an unimaginative conversion of their manual systems to mechanized ones. The most obvious deployment of this philosophy occurred in the payments system. (See Working Paper #2). Stemming approximately from the middle of this decade, a definite change in banking techniques took place as a result of a shift in banking philosophy.

Towards the middle of 1970, the banks began to recognize that they were not just financial intermediaries but also, in connection with that role, processors and storers of information. This realization enabled the banks to think more creatively about the types of banking techniques which should be implemented. Coincidentally, the increasing mechanization of manual systems had begun to diminish the importance of the branch as an integral unit of the "bank". These two factors combined to become a catalyst for the bank's shift away from merely mechanization of banking techniques to the development of automated techniques. The computer and its systems have become the centrepiece of financial innovation. It is this fact that has increased appreciably the rate of change in this transition stage of developing banking techniques. It appears that with the further development of a number of automated systems described in this paper that the era of electronic funds transfer will be a fact in the Canadian financial industry.

The remainder of this paper describes the emerging banking techniques. The dichotomy between mechanized banking and automated banking is used throughout this descriptive model. A mechanized technique is one which was developed to merely convert a manual system to be a more efficient mechanical one. It would have been developed for purposes of efficiency with little done in the way of future planning of the way in which business was going to be conducted. Conversely, an automated technique is one which has emerged since the middle 1970's and involves recognizing that the bank is a processor and storer of information and has been initiated with a consideration of the effects in the future of the technique on the business being conducted. The paper is divided into three major topic areas; Deposit Clearing Facilities, On-Line Banking and Credit Cards.

I. DEPOSIT CLEARING FACILITIES

The increasing volume of cheques flowing through the Canadian payments system as described in Working Paper #2 has led the banks to search for means of cutting down the flow of paper. The automated techniques which are emerging have been grouped under this heading. The final topic under this part of the paper is "Pre-Authorized Debits". This topic is included to indicate that ultimately the whole payments system could move from its present credit form to a debit form. Therefore, to understand deposit facilities, it is necessary to recognize that new systems can be developed which merely reverse the viewpoint from which the transaction is examined.

In 1974, the federal Department of Supply and Services indicated its desire to engage in direct deposit of a number of government payments by providing a bank with magnetic tape rather than cheques. This initiative of the federal government

acted as a catalyst for the banks to develop a deposit facility for the receipt of credit transactions on magnetic tape or other electronic input form.

These facilities involve the accepting from a client of deposit information on magnetic tapes which can be read by a computer. At a regional data centre, the tape is then sorted by computer. One tape or paper copy (hereinafter referred to as "hard" copy) is produced for each bank for whom there is deposit information. Generally, however, the banks will not provide tape to non-bank financial institutions such as trust companies. That tape or hard copy is then turned over to the appropriate institution. The data centre also sorts the tape for the bank's own accounts into those accounts for which an electronic transfer can be made and those for which it cannot. Credits are then made electronically by the regional data centres to those accounts capable of accepting such transfers. For accounts unable to accept electronic input hard copy is produced. There is no equivalent hard copy for the electronic transfers, however, there is an audit trail.

The procedure followed by the federal government is to turn over a magnetic tape to a "Designated Receiving Bank" (DRB) who would in turn, break the tape up as described in the preceding paragraphs. In contrast to this procedure, the Province of Ontario supplies tapes containing only a particular bank's credit items to three banks. Two other banks receive their own items and transit items on tape. The transit items are broken up as described in the preceding paragraphs.

In developing these capabilities the Canadian banks have not followed a route which would permit the direct interfacing of computers. This is an obvious substantial impediment to the development of an Electronic Payments System in Canada. What the Canadian Bankers' Association has done is set format standards for different forms of input. If the transmitting client or bank complies with the

standards any banking system will be able to input directly any electronically stored information received from the supplying institution. Therefore, there is no need and accordingly no capability of any bank system to interface, by high speed communications, its computer system with that of another bank.

Credit items on magnetic tape obviate the necessity of the payor issuing cheques for each item on the tape. Instead, the tape together with a payment instruction is delivered directly to the paying institutions. In the case of the federal government that institution is always a chartered bank. It is obvious that credit items on magnetic tape reduce the flow of cheques through the Canadian payments system. The system has a further benefit in that it eliminates items being returned for insufficient funds. Obviously this is not a concern where governments are involved but will be as the number of payors providing tapes to banks increases.

When a cheque is issued it is transmitted to a creditor who deposits it. The paper cheque then proceeds through the payments system. The major characteristic distinguishing credit items on magnetic tape from the traditional chequing system is the payment instruction or credit order accompanying the tape. It has obviated the necessity for the creation of a cheque and in so doing has reversed the flow of financial data. The payor deposits his money and then the magnetic tape is used to draw down the deposit by redepositing it in the various payee's accounts. Therefore, the credit system is in direct competition with the present payments system.

The credit order has been accorded a status similar to a cheque in that it can be revoked before payment date. In the United Kingdom's GIRO system, this is not permitted. In the future, credit orders may cause problems in this country in that money can be removed from an account before due date. The credit order is also a disadvantage in its competition with cheques since there is consider-

able doubt as to the proper legal characterization of a credit order. Until this legal vacuum is clarified, it will undoubtedly impede the development of this automated banking technique.

The other impediment to this automated banking technique is the absence of any automatic clearing houses in Canada². An automatic clearing house would provide the facilities to break a tape down into its various bank components. The "designated receiving bank" of the federal government and the banks receiving transit items from the Ontario government are currently providing this clearing facility. An automatic clearing house would provide a formal clearing organization for magnetic tape interchange and make the system available to all institutions on an equal and fair basis. At present, the banks control the credit order systems in Canada. At the moment, no automatic clearing house is necessary because only the banks are engaged in the inter-bank transfers of magnetic tapes and there are relatively few of these tapes. As the use of magnetic tape interchanges increases and participation by other deposit taking institutions is permitted, the demand for automatic clearing houses will become apparent.

Some examples of the present use of credit orders include the following:

(a) Automatic Payroll Depositing

This banking technique originated in Canada with industrial credit unions. All members of a credit union have a common employer resulting in the credit union having little difficulty in persuading the employer to deposit payrolls directly with it.

The banks have in the past, provided payroll services by assisting in the preparation of pay envelopes containing cash. Now, because of the banks' computers and their ability to receive credit orders by electronic input, the employer need only prepare his computer tape and deliver it to the bank. This service began to be marketed by the banks in early 1975.

From the financial institution's point of view automatic payroll depositing has the benefit of reducing costs due to the reduced flow of cheques and the use of personal teller services. From the payor's point of view the advantage is seen to be that the costs associated with the preparation of payroll cheques and reconciliation of the negotiated cheques is greatly reduced. However, an employer payor may be reluctant to lose the float associated with payroll accounts. Most employers will have statistical information indicating that e.g. half the employees cash their cheques within two days of receipt and the remainder cash them over a five to ten day period. Automatic payroll depositing prevents the employer from relying upon this pattern of employee behaviour to deposit the payroll funds over several days. A paternalistic employer may not wish to lose the perceived benefits accruing from the personal delivery associated with payroll accounts. From the payee's viewpoint the advantages of automatic payroll deposits are more restricted. It obviates the necessity of attendance at a financial institution to cash the cheque. This may be an advantage when an employee is on vacation or sick but at other times may not be, since the personal depositing of a pay cheque is usually associated with a cash withdrawal. This advantage may disappear as the wide spread use of cash dispensers becomes available.

Surveys show³ that employees see little advantage from automatic payroll deposit. This is apparently caused by a strong psychological desire to actually see one's pay cheque treating it as tangible reward for work. More recently employee attitudes are changing.

An offshoot of the automatic payroll deposit system has been the banks' and other financial institutions' marketing to corporate clients a variety of financial services to assist them in rationalizing their own bookkeeping functions and managing their cash flow. A separate corporation⁴ by the bank is set up to offer computerized bookkeeping, account reconciliation, payroll accounting, billing and accounts receivable and advisory and management services, together with accounts payable and pre-authorized debiting and cash consolidation and funds transfer.⁵ The result of these developments is that the banks have

become direct competitors of independent data processing companies. Criticism by the computer processing industry was so intense that the federal government issued guidelines with respect to the chartered banks' computer processing activity.⁶ These guidelines restricted banks to offering computer services in connection with wholesale banking services, i.e., computer services to other financial institutions and automated payment services. This digression gives some insight into the effect that changing electronic banking techniques can have on the range of services intended under the Bank Act.⁷

The banks are beginning to market more than just automatic payroll depositing. The automated banking technique of credit orders on magnetic tape is a flexible one with many uses. The banks are now encouraging corporations to use credit orders to make any of a company's regular payments such as pensions, dividends and interest. The potential for other uses is limited only by the creative imagination of those using this technique as an innovation for financial change.

(b) Direct Deposit of Interest on Canada Savings Bonds

The marketing of the 1977 Canada Savings Bonds by the federal government marked the withdrawal of the coupon bond offered in all previous issues. This is an illustration of the federal government's interest in developing an electronic funds transfer system and eliminating paper flows. For the first time a bond holder can elect to have interest credited automatically to his bank or other deposit account. The process for depositing this interest will be to supply a tape to a Designated Receiving Bank for distribution to other banks. It will be handled in a similar fashion to the credit orders for other government items. It does, however, present unique problems in that there has to be a system to ensure that the recipient is still living.

For some time intra-institution electronic debiting and crediting has been in existence. Some trust companies have a similar system for depositing interest on Guaranteed Investment Certificates (GIC's). All financial institutions now make deposits of interest directly to savings accounts which, if the account is at a branch connected to the data centre, is accomplished electronically. Some corporations are paying dividends by automatic deposit and the banks offer this service to their own shareholders. The CSB issue marks the beginning of inter-institutional electronic credits.

From the financial institutions' viewpoint, it reduces the workload at certain high peak periods in the year. It enables them to process millions of CSB transactions for example in a single day. It does have the disadvantage that many bank accounts may be opened by people who never formerly had a bank account. These accounts may well become dormant in that the interest deposit is withdrawn and the account will not have any activity until the next interest payment date. From the government and the bank's point of view, it eliminates a considerable amount of work in handling the old paper coupons. From the payee's viewpoint, it has the benefits of secure safe depositing without the risk of theft or delays associated with the postal system.

(c) Pre-Authorized Debits

Traditionally the Canadian chartered banks have not provided customer payment services in the form of pre-authorized debits on a large scale. Generally any direct debiting that was done was confined to regular payments received by a bank from its customers such as the repayment of a bank loan. The banks have allowed other financial institutions such as insurance companies to avail themselves of pre-authorized payments. These debits operate in a similar fashion to the banks' pre-authorized debits. However, these transactions do not reduce the amount of paper because either the bank or the insurance

company creates a document similar to a cheque which is then returned to the customer with his other cancelled cheques on his statement date. Furthermore, the legal framework surrounding these transactions is cumbersome. The customer of the bank who is also the client of the insurance company must first give a power of attorney to his insurance company to deduct funds from his account. The insurance company then has to enter into an indemnity agreement with the bank to save harmless the bank in the event that an act by the insurance company in connection with the account would give the customer a course of action against the bank. These legal arrangements are an obvious impediment to the growth of the present system of pre-authorized debits as a banking technique. Consumers will be reluctant to give powers of attorney over their accounts to any one other than the highest caliber company such as an insurance company. Similarly, there are very few companies with whom the banks would be willing to enter into an indemnity agreement. One alternative for those companies unable to obtain pre-authorized debits is to receive a series of post dated cheques. Presently, the post dated cheque is the usual technique employed to facilitate contractual payments on a regular basis.

The coming years will see the emergence of a new automated banking technique involving the pre-authorized debit payment of an account. This system may involve the development of what is to be known as a "standard turnaround document" (STD). It will enable the growth of the pre-authorized debit banking technique as well as the payment of regular accounts over the counter at bank branches. It will greatly increase the flexibility and volume of transactions which can be paid using this automated banking technique. It should be noted that there is no industry consensus on these developments at this time; some banks are not convinced of the efficiency of this technique.

The technique involves the use of a pre-encoded standard turnaround document upon which the payee has prepared his account. The customer/payor can issue a cheque in which case the STD represents merely an invoice. Alternatively, the customer/payor can take the STD to his bank branch where it can be used as a credit order. The pre-encoded information can be then stripped from the STD in the bank branch after verifying that the funds are in the account. The information will then be transmitted to the data centre where it will be credited to the payee and the information passed on to the payee for updating its accounts receivable. The general characteristics of this emerging technique is that bills will be paid directly by a bank to the creditor, from the customer's bank account on a monthly or regular basis but only when the customer activates the process by using the STD⁸. It is in respect of the customer activating the process that this system will be different from the automatic pre-authorized debit technique currently in use. This emerging technique is a transitory one permitting evolution towards an electronic transfer of funds. The system as it is currently emerging will not require the electronic transfer of funds although it will be accomplished electronically in some cases.

As was pointed out above, one of the elements limiting the present use of pre-authorized debiting is the customer's feeling of loss of control over his account when deductions are made automatically. Control of the timing and the amount of payment is lost, thus making him feel that he no longer controls his finances. Consumers also feel that merchants are more willing to take goods back when they are not paid for. Consumers also fear that banks and the users of pre-authorized debits can make mistakes in the amounts charged and that it might be impossible to rectify. New legal protections will be needed here.

The standard turnaround document obviates many of the fears consumers have of pre-authorized debiting as it presently exists. The STD is the equivalent consumer retail banking development to the direct depositing technique currently employed by corporations and government.⁹ As the STD grows in popularity the step from its use to electronic payment of accounts becomes easier to make. However, there are drawbacks to the use of the STD which will deter some banks from the implementation of this technique. At the present time, the cheque is becoming increasingly efficient. As a result, the STD may be overlooked by some banks as they direct their efforts to phasing out paper completely rather than employing the STD which is of course paper-based. In addition, the implementation of the STD involves the development of a standard creditor identification procedure. This major undertaking is viewed as a problem because of the wide variety of creditors and the levels of their sophistication and systems.

Under electronic funds transfer this banking technique is likely to be something along the following lines. A customer would authorize his deposit-holding institution to pay any bill submitted by specified companies up to certain maximum amounts. A company on this list then prepares its computer tape of its accounts receivable including the name of the payor, the amount owed, its due date, the account number and institution to be debited. The tape would then be turned over to the bank. Subsequently, the bank would break down the tape in the way described above in (a) for automatic payroll depositing. Such a development is likely to increase the need for automated clearing houses for these magnetic tapes.

Telephone bill paying may emerge as an automated banking technique alternative to the STD developments. At present it is a very popular development in the United States.¹⁰ Typically, the bank customer enters an agreement in which he authorizes the bank

to withdraw funds from the customer's account on the customer's telephone instructions. The withdrawn funds are then paid to merchants, utilities, credit card companies, and financial institutions with which the customer of the banks has existing accounts.

During business hours, customers may converse either with an operator or an automatic teller depending on the bank's system. After hours, the customer will communicate with a voice-activated recorder which will record and store all information prior to processing. The next day, the regular operator will listen to the recording and process the payments.

To ensure the security of the system, each customer is given a personal identification number which must be used as positive identification before the operator will allow the payments to be made. Also, the bank supplies the customer with a periodic descriptive statement itemizing payments authorized by telephone in the order in which they have been made; this statement is considered to serve as proof of payment.¹¹

The telephone bill paying system has not had the same success in Canada as in the United States. No Canadian financial institution employs the system although at least one bank, the Canadian Imperial Bank of Commerce, is presently considering its implementation. The CIBC justifies the system as a "consumer convenience". There are still many problems to be worked out with the system. For evidentiary purposes, the system must produce a sufficient descriptive statement as proof of payment. Also, the system relies on manual intervention; an operator is necessary to answer the telephone and make the transfer

memos. For these reasons, some banks feel that the telephone bill paying system is no more efficient than the present payment system based on cheques because it would not significantly reduce the production of paper. The system will function in a most efficient manner when it is an on-line real time system. In this regard, the telephone bill paying system is still a futuristic concept in Canada.

2. ON-LINE BANKING

The banks' computerization in the 1960's centred around the use of electronic "batch processing" to ease and speed the handling of paper both within and between institutions. The banks simply mechanized their existing manual systems relieving the branch staff of tedious bookkeeping duties. This system is still the principal way in which the payments systems is operated. Reference should be made to the Payments Study for a complete description. The essence of the system involves the "batch processing" of transaction information on a central or regional computer to update the demand deposit accounts of the various branches overnight. It is from this format of computerization that the banks and other financial institutions are now computerizing other activities on an on-line basis.

On-line banking involves the transmission of the data electronically from one input device to a computer facility and back to the output device. The transmission of data is done either on a "real-time" or "time-sharing" basis.¹² In either case, the transmission is virtually instantaneous and is a two way communication between the branch terminal and the computer centre.

At the present time virtually all the banking systems including those referred to as on-line operate in a batch mode for updates to the master files. The appearance of being on-line on a real

time basis is given by the use of "skeleton files". The on-line portions of the system operate the skeleton file which contains an account number for each account, last night's balance, any bank-items that have not yet been posted to the passbook, and any transactions that have occurred during the day, along with a running balance. The update of the master files is then done in a batch mode over night.

The first on-line installation in Canada was made in 1967 when the caisses-populaires connected a branch on the Expo site in Montreal to a central computer. By 1974, 295 caisses-populaires were connected and the files of 1.7 million members, representing half the membership at the time, were being processed by a central computer in Montreal. The chartered banks began experimenting with on-line banking by 1969 but it was not until the early 1970's that any significant on-line facilities were available within the banks.¹³

Waterloo-Trust (now owned by Canada Trust) was the first financial institution in Canada to have a complete in-house system operating for all of its branches.¹⁴ Canada Trust expects to have a fully operational complete in-house on-line system during 1979. That system will employ the new 3600 family of terminals which I.B.M. started marketing in 1977.¹⁵ Of the Canadian chartered banks, the Bank of Montreal, is the closest to having a complete in-house on-line system operating for all of its branches. The original target for achieving this system was December, 1974. That target date was overly optimistic and it is doubtful if it will be achieved by 1979. One of the apparent problems with that system is that it is using I.B.M. 2900 family of terminals. The 2980 which is a special hybrid machine developed for the banks has a very limited range of function capabilities and is now outdated by the 3600 series.

At the present time, on-line banking facilities deal with chequing accounts, savings accounts, current accounts and teller funds holding, stopping funds, and identifying individuals. At the present time, the banks have few on-line facilities, for term deposits, mortgages, loans and sundry services such as issuing travellers cheques. This is principally because the present I.B.M. 2970 equipment uses a different operating system than the new 3600 equipment. In 1977 I.B.M. introduced an operating system known as "COFIS" (Canadian On-Line Financial Information System). COFIS is a software operating system which has been put together by I.B.M. and is being marketed to the trust companies. At the present time there is no equivalent package of software which is being marketed to the chartered banks. Therefore, the banks are refraining from developing more applications to their 2900 series equipment. To put new applications into their on-line networks would simply increase the conversion effort involved in transferring to the 3600 equipment. This hiatus period will last long enough to develop the necessary software for the banks to be able to use the 3600 equipment.

The movement to a true on-line real time system in most financial institutions will be relatively slow due to the high costs of such development plus the fact that most financial institutions are satisfied with the current skeleton file on-line system.

A true on-line real time system is necessary before the need to have real time connection between various institutions' system will be developed. Aside from the banks' current views that the skeleton file on-line system is satisfactory, for the

moment the spectre of real time connection between bank computers raises great fears for the banks. Most financial institutions currently are extremely reluctant to foster developments towards direct access to their master files by outside institutions. Such direct access, unless controlled in an extremely rigid fashion, would expose the institution to severe security risks as well as exposing the customers to a potential loss of privacy. Other financial institutions are not as terrified about these developments. They point out that direct access is already successfully in use in the United States and internationally for SWIFT. The privacy problems can be solved by encryption. Non-bank financial institutions' concerns are of a different nature. It is feared that if the banks have access to their files the information they can retrieve might be capable of unfair use by the banks. For example, if names and address were retrievable, the banks could then try to attract these people as customers, thereby lessening competition. It therefore is not likely that in the foreseeable future there will be automated clearing houses or inter-bank switching facilities handling real time computer transmissions. The stage at which the development of on-line banking is likely to remain for the present is at the interfacing of bank computers through the use of magnetic tape. The procedures developed through the Canadian Bankers' Association allow any customer, government or otherwise, to deliver tapes either with on-bank items inter-mixed with other-bank items or with exclusively on-us items to any bank at the customer's discretion. It may, therefore, be necessary to develop automatic clearing houses for the batch inter-change of items on magnetic tape between some groupings of deposit taking institutions. The trust companies are now looking at this possibility.

The development of complete in-house on-line banking facilities is the key to the development of an electronic funds transfer system. Although it is possible that the Canadian EFT system may never become an on-line real time system where one computer interfaces with another, it can, through the use of magnetic tape achieve what could be termed an electronic funds transfer system. The completion of the conversion to the 3600 I.B.M. equipment will mark the end of the present hiatus in increasing the applications of the computer. By late 1978 or early 1979 the development of new automatic banking techniques should begin again. With those developments the need for magnetic tape switching facilities will likely emerge. Some of those developments are likely to involve cash dispensing and customer operated tellers or automatic tellers. These techniques are described below; connected to the emergence of more complete on-line systems will be the merger of credit cards into the system. This will in turn assist the emergence of credit/cheque verification services and finally point of sale terminals. These techniques are described under # 3 "Credit Cards".

(a) Cash Dispensers

Cash dispensers were test marketed by the Canadian Imperial Bank of Commerce using a British built machine in 1969. This machine developed by the Chubb Company was activated with a returnable card and a customer's secret code number. Each dispenser was connected to the bank's computer. By 1970, the bank wished to introduce the dispenser nationally but considered the cost of wire services prohibitive,¹⁶ although today with "Datapak" and "Infoswitch" this would no longer be the case.

In 1972 for inexplicable reasons, CIBC started installing an off-line cash dispenser which the Chubb Company had developed for the English market. This machine being off-line was not as sophisticated as its predecessor. It set back the development of cash dispensers in Canada for at least five years.

At present those banks offering cash dispenser facilities do so with off-line connectors to an I.B.M. data centre. The information is collected by the data centre and then crossed over to the financial institution's data centre. Then information must be crossed back from the financial institution to the I.B.M. centre. This cumbersome procedure has obviously inhibited the development of cash dispenser in Canada. The only institution which has an on-line cash dispenser is the Sherwood Credit Union in Regina. They are using the 3614 cash dispenser, one of I.B.M.'s new 3600 family of terminals, modified so it can be on-line to their own computer. Two chartered banks began experimenting in the Toronto market and one of them in London and Ottawa during 1977 with on-line units. As of November 15, 1977, there were only 34 of these units being used by the two banks. These experiments still have the major drawback that they are not on-line to the bank's data centre but rather to the I.B.M. service bureaus.

The banks have not been very aggressive in marketing their cash dispenser capabilities. For example, they have generally kept the machine located at existing bank branches. The customer has little need to use the dispenser if he is already at the bank branch unless it is after hours.

The full potential of cash dispensers will not be obtained until the terminals have on-line access to the Demand Deposit Accounts, savings and credit card accounts in an on-line mode. Before the 3614 unit can be on-line the software in the 3601 controllers and at the Bank's central computing sites must be put in place. After that has been done the cash dispenser can interface with the bank's files at the data centre in an on-line mode. This new application of an automated banking technique will be delayed until the financial institutions have made the changeover to the 3600 I.B.M. equipment. This will likely cause a delay of two years.

At present because the cash dispensers are not on-line to the user's bank accounts, the marketing of this technique has been restricted. The off-time mode in use with these machines involves a credit risk to the financial institution each time the machine is used. Therefore, cards are issued only to individuals with an established credit rating who are usually holders of the bank's credit card.

Cash dispensers are not, as yet, an automated banking technique. When they can be integrated into the on-line branch banking system, they will become an automated banking technique. That will not occur until after the hiatus period while the switch over to the 3600 I.B.M. equipment is completed. At that time the banks will likely aggressively market the cash dispensers. The banks are more likely to encourage the development of this automatic banking technique than the other financial institutions. The cash dispenser does not diminish the utility of the large branch banking network of the Canadian chartered banks nor threaten the investment in the network. It effectively enables them to extend their branch hours in respect of cash withdrawals without any of the cost associated with extending the hours of banking at a particular branch. It is for this reason that the most likely developers of the cash dispenser technique will be the chartered banks. At the moment everyone is hanging back waiting to see who will make the heavy investment in consumer education necessary to encourage consumer use so that each dispenser will be in wide spread use. Accordingly, it is unlikely they will emerge in wide spread use for from 3 to 5 years.

Cash dispensers are the forerunner of automated banks which will evolve using automatic customer operated teller machines (A.T.M.). Although some of the cash dispensers currently in use are in fact A.T.M.'s, they are not used as such because their function is limited to dispensing cash. As the dispensers are merged into the on-line branch banking system, the use of A.T.M.'s having a full range of retail customer services will appear.

Interestingly, the position of the financial institutions on the use of A.T.M.'s is probably the reverse of the cash dispenser. The other financial institutions could achieve substantial market gains by the use of A.T.M.'s as a form of branch, because they do not have the vast branching networks of the banks. A.T.M.'s provide a cheap vehicle for other financial institutions to rapidly increase their branching networks at substantially less cost than the way the chartered banks developed their networks. The major inhibiting factors at the moment is the inability to convert the A.T.M. to the on-line system of these financial institutions together with the massive consumer education (marketing) investment needed to generate consumer acceptance and use of A.T.M.'s. For this reason these financial institutions may well defer development until the chartered banks have made their consumer education/marketing investment in cash dispensers. At that stage the cost of consumer education/marketing investment for A.T.M.'s is likely to be substantially less than it is at the moment.

The automatic teller machine banking technique is discussed below.

(b) Automatic Teller Services

The American banks began to move from cash dispensers towards machines providing a full range of tellerless banking transactions. In 1971, the Docutell Corporation studied marketing its "Total Teller" (TT300). In 1977, this corporation brought out its second generation A.T.M., the "Total Teller 2000". On September, 1977 this product was withdrawn from the market¹⁷ in order to permit the company to readdress the entire cash dispenser/automated teller market. This decision is apparently a reflection of the fact that the ATM market is growing more slowly in the United States than was originally expected.

An A.T.M. can handle up to 95% of the transactions performed by a human teller.¹⁸ The machine can receive deposits to accounts, transfers between accounts, dispense cash from accounts or credit lines, receive payments for credit cards, loans and specified bills and provide updated information on an account. These machines are activated by the insertion of a coded magnetic stripe. The customer then must punch in his personal identification number (PIN). In the case of the I.B.M. 3614 A.T.M. the machine scrambles the PIN, and transmits it in this form. The host computer de-encrypts the PIN to identify the customer.

By mid 1974 there were some 24 A.T.M. installations in Canada,¹⁹ but all of these machines were located in bank branches and were off-line. In the United States the greatest use of these machines has been for cash withdrawals, this fact explains why some Canadian banks either use solely cash dispensers or restrict the A.T.M. to this function. The development of A.T.M.'s in Canada has been slow. The banks have very little interest in it because they do not need additional branches. In fact, A.T.M.'s represent a threat to the present branch investment of the banks. All financial institutions are reluctant to be the innovators in the field. The innovator will have to spend large sums of money on consumer education in the form of marketing. There is likely to be little return on that investment because the other financial institutions will be able to ride on the coat tails of the innovator who is the first in the field. The other major problem is that although the computer technology is available, it is not packaged in a way which enables either the banks or other financial institutions to easily use the A.T.M.'s in an on-line mode to their data banks.

Despite these problems, certain credit unions and trust companies are developing this banking technique as a cheap way of multiplying their branching network. Canada Permanent Trust is in the process of developing a nation wide system of teller terminals. At the present time, it is planned that approximately 100 A.T.M.'s will be placed at both on and off premise locations. These will be the first A.T.M.'s to be located in places other than a branch of the financial institution. For this project, Canada Permanent is employing "Datapak" wire services. Another innovative feature concerning these A.T.M.'s is in fact that they are constructed to allow additional services, such as POS terminals, to be added.

In Saskatchewan, the credit union league is presently developing a provincial A.T.M. network and there are plans to link this network to Ontario credit unions in order to allow an interchange between provinces. Eventually, it is hoped that this project will grow into a national network.

In a speech to the National Security Conference of Canadian Financial Institutions in Toronto on November 16, 1977²⁰ it was suggested that by 1985 there will be three levels of banking services, first, full-service branches as we currently know them today, secondly, limited service branches in which everything is on-line to a central computer and thirdly, automated teller machines. This third level of service for all intents and purposes is non-existent today. Nevertheless, the interviews conducted in conjunction with this study indicate that the banks are keenly interested in developing this automated banking technique. If the predictions concerning the three levels of banking services made at the National Security Conference of Canadian Financial Institutions are to be fulfilled, then the development of this automated banking technique has a high priority amongst Canadian financial institutions.

As was pointed out above in the discussion of cash dispensers the A.T.M. can only move out of its present embryonic stage when the financial institutions have the capacity to connect the A.T.M. directly on-line to the data bank. Widespread use of the A.T.M.'s will only occur at that time. At that stage, it can be said that A.T.M.'s are a part of the evolving electronic funds transfer systems. Policy decisions of government made in the next few years could dramatically affect the development of this automated banking technique.

In the United States a number of states have passed compulsory sharing legislation in an effort to prevent the location of self-service banking on every street corner. It has been recommended by the Economic Council of Canada that similar legislation be introduced in Canada. Adoption of such a recommendation could have wide sweeping ramifications for an automated banking technique which is in its infancy. The multiplicity of types of application software being used by various institutions together with the varying kinds of terminals and communications protocols may well mean that interfacing various networks may well be impossible. Therefore, premature legislation is likely to retard the development of A.T.M.'s and P.O.S. terminals rather than encourage and regulate it.

However the sharing of off-premises automatic teller units would require interchange facilities leading to the development of automated switching and processing centres and automated clearing houses. It would also force financial institutions to develop the capacity to have their data banks able to inter-act on an on-line basis with other data banks. At the present time, the impression gathered in developing this study has been that at least the banks have very little interest in direct inter-bank communications between data banks. In fact, it seems that they view this as a highly futuristic notion and one which has only a remote possibility of occurring.

It appeared to the research team that this was caused by the banks' collective desire to move into this stage of electronic funds transfer at one time as a group. This would prevent any one bank from obtaining a competitive advantage over any other bank by developing this automated banking technique more quickly than its competitors. If this impression is accurate, then the rate at which an electronic funds transfer system evolves in Canada will in part depend upon whether legislation is put in place which has the effect of forcing financial institutions to develop the capacity for direct on-line communications between data banks. The most likely way for this to be achieved would be through compulsory sharing legislation.

The use of automatic teller machines as an evolving automated banking technique is a cornerstone in the development of an electronic funds transfer system. It cannot occur before the bank's internal functions are completely on-line. However, at that time their growth can be very rapid.

There is some question whether A.T.M.'s should be considered legally to be performing banking functions. If they are, then their control will come within federal legislative jurisdiction. Regardless of who has legislative jurisdiction, it may become necessary to require sharing of free-standing automated teller units allowing any deposit-taking institution's customers with a properly encoded card to have access to any unit. This is presently thought to be the only way in which point of sale terminals (P.O.S.) will ever become a reality in Canada. Although this does not appear to be a limiting point for A.T.M.'s it might well speed the introduction of such machines and facilitate the working out of sharing arrangements ultimately required for the P.O.S. system. Careful monitoring of developments in this area will be required. Legislative responses concerning this banking technique will definitely have an impact on the final configuration of the Canadian electronic funds transfer system. A constant monitoring of this technique will enable policy decision makers to assess whether the emerging system is consistent with the government's policy concerning the configuration of the EFT system.

3. CREDIT CARDS

The introduction of bank credit cards was a significant innovation in banking techniques. It is considered to be the forerunner of debit or money cards which may be the universal access to the electronic funds transfer system.

There are three types of credit cards: private label cards, travel and entertainment cards and revolving credit cards. It is this latter type which financial institutions issue and this paper, being one on banking techniques, focuses upon the revolving credit cards of banks.

In the United States banks began issuing credit cards in 1951. A bank's credit card was restricted in its use to the local area because the banks were restricted as to the geographic location of branches. To overcome this obstacle two major national bank credit card systems were formed in 1965; The National Bank Americard Incorporated now known as VISA U.S.A. Inc. and the Interbank Card Association (which includes Master Charge).

In 1968 the Toronto Dominion Bank, Canadian Imperial Bank of Commerce, Royal Bank of Canada and Banque Canadienne Nationale joined the Bank Americard scheme and introduced their bank card known as Chargex.²¹ The Bank of Nova Scotia joined this group of banks in 1973 after the failure of its cheque-guarantee plan. The Chargex scheme did not become a national one until its introduction in the Maritimes in the summer of 1971. This scheme is now known as VISA/Chargex. In 1973, the Bank of Montreal and The Provincial Bank of Canada became members of Master Charge.

At the present time no other financial institutions aside from chartered banks offer the bank credit cards. In fact, the arrangements with the bank groups are set up in such a way to make it difficult for these institutions to join. In addition, existing legislation for trust companies²² makes it difficult to utilize

credit cards because they are only permitted to have 7% of their assets in consumer loans. Other financial institutions would also have to apply for exemption under the Small Loans Act²³ as the rate currently charged by the banks on cardholder's outstanding balances is in excess of that permitted by the statute.

The Visa and Master Charge systems operate essentially in the same way. Merchants are solicited by a member bank and enter into a contract with that bank and must maintain an account with it. Cards are issued by a participating bank to a credit worthy individual under an agreement between the cardholder and the bank.

If a purchase made on a card²⁴ exceeds the merchant's floor limit, then the merchant is required to call for credit authorization. A failure to do so will result in a chargeback if it is subsequently found that the transaction was fraudulent or otherwise defective. At the authorization centre a check is made by computer to ensure that the amount of the purchase is within the credit limit assigned to the cardholder. If the computer check turns up insufficient credit, the customer is not declined. The transaction is referred to a credit supervisor who can deal directly with the customer by phone. Once authorization is granted the merchant uses the card to imprint a standardized sales ticket, enters the amount of the purchase and requests the cardholder to verify the sale with his signature which should match that on his card.²⁵

At the end of the day the merchant deposits the slips with his bank where he is given credit less a discount which is established in his agreement with the bank. In effect, the bank has assumed the merchant's accounts receivable.

The sales tickets used to be cleared back to the cardholder in a similar fashion to the way cheques were returned. In 1975, in an attempt to cut down the flow of paper generated by the

use of credit cards the banks switched to descriptive billing. Since that time the sales ticket has been cleared by the merchant's bank to its data processing centre. Those data centres are different from the bank's on-line systems and are found in Montreal, Toronto and Vancouver. At the credit card data centres the sales ticket is microfiched and the information on it is put into electronic form for processing by computer. The computer then sorts the information into items which are on the issuing cardholder's accounts and items for other card issuer's data centres. The other issuer's data centre then receives magnetic tape of its items together with a microfiche of its sales tickets. The procedures for exchanging tapes and microfiches are governed by rules established for the purpose. The cheque clearing system is not used. However, the final settlement of balances is carried on through the settlement process used for the payments systems settlement. The amount represented on the sales ticket then remains as a credit item on the cardholder's master file until the next billing date.

At a fixed time each month the cardholder receives a descriptive billing statement of the transactions on his card. At this time he has the option of paying off the credited items completely or of merely making a lesser payment but always in excess of the minimum payment and allowing the balance to be in effect a loan to him at an interest charge per month set out in the cardholder agreement with the bank.

Aside from the use of the credit card to make purchases a cardholder can obtain cash advances with it. These transactions unlike the purchase ones involve the charging of interest from the time of the advance rather than after the sending of the monthly bill.

The banks originally decided to keep their computer systems for credit cards centralized through their general offices. In the case of four banks the credit card system has little connection with the branch banking system. The Bank of Nova Scotia and the Royal Bank use their branches as an integral part of the operation of the Visa/Chargex systems. The branches do credit verifications, follow-up on delinquent accounts, and so on. All the branches including those banks who delegate certain tasks to the branches have a department at the general offices responsible for overall Visa/Chargex activities. In all cases these departments are separate from the computer or systems departments of the banks which operate the branch banking system.

There appear to be some conflicting views as to what is likely to develop in connection with credit cards. It is possible that the credit cards systems could be merged into the on-line branch banking system. Alternatively, the presently separate facilities of each bank could be merged into a single Visa system centre or by real time connection between the data centres of each bank. The Master Charge scheme is connected by a real time system.

The development of either possibility has some significant implications for the evolution of an electronic funds transfer system. The banks in favour of merging the credit card systems into the on-line branch banking system are likely to be those who presently delegate certain functions to the branch. This is not likely to happen because it would increase response time, require decentralization and loss of control of the systems and make it more difficult to control fraud and ensure security. Of these three factors the response time is likely to be the most significant. The volume of business being processed through the system would be so great that the waiting time of a customer at the branch would rise dramatically. The system would be overloaded and customers would have to wait to get transactions processed. However, if such a merger does take place it would facilitate the more rapid development of cheque authorization and verification which are likely to be the forerunners

of the development of point of sales terminals.

The more likely development is the merger of the now separate Visa/Chargex departments of the banks into one VISA centre. It would be accomplished by real time connection of various computers or merely by the central co-ordination of the exchanging of credit information. Regardless of the way it is accomplished it will not enable the use of the system for authorization and verification of cheques. It would still enable the development of point of sale terminals but their use would be inextricably linked to credit cards. There would be no capacity to have instantaneous transfer of funds from the purchaser's bank account to the vendor's bank account without a further connection to the on-line banking system. The result would be that point of sale terminals become a somewhat useless but sophisticated application of the present credit card system.

Therefore, the monitoring of credit card developments amongst the banks is a key area to assessing the rate of development of electronic funds transfer in Canada. At the moment that system does not appear to be developing at all.

Credit authorization networks and point of sale terminals do not exist in Canada at the present time. A general discussion of these techniques is included below in order to complete the picture in terms of future banking techniques. The information has been gathered from U.S. sources. Its inclusion should not be taken to infer that either technique will emerge in the Canadian financial industry.

(a) Credit Authorization Networks

The reason for the delayed entry of the Bank of Montreal, the Provincial Bank of Canada and the Bank of Nova Scotia into the credit card field was their decision to try to develop cheque guarantee systems. These systems involved guaranteeing the cheque

which was being given to the payee. This guarantee also involved the bank in extending overdraft privileges to the payor if there were insufficient funds in the payor's account. It is likely that these schemes did not meet with success in Canada because of the ready acceptance of cheques in Canada without guarantee cards.

The present authorization networks associated with the bank credit cards inform the inquirer whether the grantor of the credit will extend credit to the consumer and pay the charge when presented to the credit grantor by the inquirer. A cheque verification only verifies existence of the consumer's account and that there are sufficient funds in the account at that time. This system does not, in contrast to the credit verification system, ensure that the cheque will be honoured upon presentation.

At the present time, there is no cheque verification scheme operating in Canada. However, when the banks have developed complete in-house on-line banking and if they merge their credit card systems into the on-line branch banking system, the capacity to provide credit authorization and cheque verification will exist. However, it will not exist until this integration has occurred. If the capacity is present the banks would in all likelihood begin to market the service.

The Bank of Montreal, in conjunction with Bell Canada and Northern Telecom, has developed a Master Charge credit authorization system that has the potential to offer a cheque verification scheme. However, at the moment, there are no such plans to expand the functions of the system. It is based on a Bell Touch Tone Telephone equipped with a "micro-processor". This phone-terminal has the ability to store the telephone number of the authorization centre and the identification number of the merchant using it.

It also has the capacity to send and receive data to and from the Master Charge centre. The verification signal is displayed on a digital readout. This "dataphone" has been in practice since early 1978 in approximately 600 retail locations. It is very simple for the retailer to operate, he simply presses the memory button on the dataphone for the authorization telephone number of the authorization centre and his merchant number. Then he keys in the card number and the amount to the authorization centre. Up to this point, the process is on-line. Once the information reaches the authorization centre, the normal (off-line) authorization process occurs. However, there are plans to upgrade the dataphone to read the magnetic tape on the Master Charge card thus simplifying the task at the authorization centre. For further convenience, the system is linked to the Interbank computer system. This allows for foreign use of cards.

Although the dataphone has a "general purpose" capacity, the Bank of Montreal only plans to use the system for Master Charge authorization. In the Bank of Montreal's opinion there is no point in advancing the dataphone project until a more integrated EFT system is in place.

In the future, such a system is likely to centre around the use of a machine-readable card. This card would be the electronic funds transfer system's equivalent of the cheque. It would be the medium for transferring deposits and therefore essential to the system. A terminal device would be activated by the card. The information on the card would be transmitted to a computer to obtain credit authorization or cheque verification. The development of such a payments card for activating a credit authorization cheque verification system would also permit the introduction of the most "futuristic" of the electronic banking techniques, the point of sale terminal.

(b) Point of Sale Terminals (POS)

As pointed out above a verification/authorization system can only emerge after most bank branches are on-line and the credit card system has been merged into the on-line system. This permits the development of a machine readable card to activate the information stored in the system. Once this payments card has been developed and used in a verification/authorization system then it is possible to extend its use to the POS terminal. It is for these reasons that POS terminals must be considered very "futuristic" in terms of the development of an electronic funds transfer system in Canada. It is not likely to show the first signs of emergence in Canada within the next five years. There are not now nor are there any plans for experimenting with the use of POS terminals in Canada.

A POS system is designed to automate payments at their source, the retail point of sale. The payments card triggers an electronic system which immediately debits the customer's account and at the same time credits the merchant's account with a deposit-taking institution, without generating any paper record except a receipt which serves as proof of the transaction. Necessary to carrying out this transaction is a switching and processing centre to receive and route messages to the appropriate financial institutions assuming the consumer and retailer are using different institutions.

The development of such a system raises many implications. The essence of the system is that the merchant becomes an agent of the bank rather than the bank effecting the transactions itself. It will require co-operation between financial institutions on a scale never before existing. The terminal may have to be shared by institutions and everything will have to be done in a standardized way. These only serve as further impediments to the probability of POS terminals ever becoming a reality in Canada.

Whether the computer systems of Visa/Chargex remain separate in each bank or are merged into some central system, the use of POS terminals under such circumstances is unlikely. The POS terminal does exactly what the imprinter now being used does. The only difference is that vastly more sophisticated equipment is used to accomplish the same result. It can not provide instant funds transfer without either connection to on-line systems or the bank branch system. In either case the use of the POS terminal is more likely to be connected to the emergence of an on-line banking system. However, the fear of invasion of privacy and security if the terminal is directly linked to bank account data information is legitimate, and of great concern to customers, retailers and the financial institutions. Therefore, POS terminals are a very futuristic idea in Canada. Their development in the United States is based on the unit banking regulations and other branching restrictions in the country. The POS terminal in the United States is another vehicle to circumvent those rules and gain market penetration in the retail consumer banking field. No financial institution, bank or otherwise in Canada is subject to these type of rules and therefore there is little incentive to develop POS capacity. However, that does not mean that A.T.M.'s will not evolve in Canada. They do represent a real opportunity for non-bank financial institutions to increase their branching activities cheaply and quickly in relation to the chartered banks.

CONCLUSIONS:

The banks first ventured into the world of computers by looking at them as ways of increasing efficiency, reducing costs, relieving workers of tedious jobs and reducing the float, resulting in a more efficient use of money. The result of that philosophical viewpoint was that the banks merely looked at their existing systems and mechanized them.

As more applications of computers to banking techniques evolved, the traditional view of computers in the banks changed. There appears to be a view emerging that banks are processors and storers of information as well as financial intermediaries. This view was more quickly recognized in the non-banking institutions. The trust companies, for example, seem to have recognized these philosophical viewpoints long before the chartered banks. The result is some of them have been the industry leaders in using the computer as the centrepiece of financial innovation. The changing philosophical viewpoint has caused financial institutions to plan new systems taking account of the customer's use as well as the banks' reasons for developing the system. These techniques have resulted in the emergence of automated banking techniques.

The development of deposit clearing facilities involves several different applications of the same technique. Its increasing use will reduce pressures on the payment system and eventually cause revisions in thinking about that system. Deposit clearing involves a debit transaction rather than a credit one. The application of the technique to automatic payroll depositing and payment of interest are vital to the process of consumer education and acceptance necessary to develop an electronic funds transfer system.

The financial institutions have been expanding the application of the on-line banking technique at a rapid rate. There is a temporary hiatus in these developments while the chartered banks make the

necessary software changes to switch to the new 3600 series of IBM equipment. The trust companies are not restricted in the same fashion in that COFIS provides the software. The growing on-line capabilities are currently moving from intra-institutional applications to inter-institutional applications such as breakdown of payroll tapes, interest payments for government and other, etc. This marks an electronic funds transfer application of this banking technique. Although it is likely to be more than 5 years before one financial institution's computer interfaces directly with another, there is magnetic interface now. This may well encourage the development of automatic clearing houses to sort these tapes within the next two years. Such a development could be carried out through the proposed Canadian Payments System and would take the evolution of the technique out of the private preserves of the banks it is currently being controlled.

The cash dispenser will probably become the major vehicle for the banks to compete with other financial institutions in terms of hours of opening and customer convenience. Whereas the automatic teller machine may well provide the vehicle which will enable non-bank financial institutions to cheaply and quickly increase their banking network, thus enhancing their ability to compete with banks. Both of these techniques will emerge in wide spread use only when they can be hooked to the on-line branch system. Their development may also be inhibited by the lack of an innovative leader. The cost of consumer education in use of the machines is very high. Once he is trained, however, he won't necessarily continue to use the investing institution's machines. Therefore, the investment may not be capable of earning a return for the institution. It is for this reason that it was concluded that wide spread use of automatic payroll depositing etc. may be necessary before any significant developments occur with respect to A.T.M.'s and cash dispensers.

The credit card represents the last major banking technique. Its present use is not likely to change greatly over the next five years. The more sophisticated applications of credit cards to cheque verification and POS terminals lack any real incentives from the financial institution's point of view to ensure their development. This is only likely to occur in Canada if there can be a direct link between a financial institution's direct depositing account computers and the terminal. This remains an extremely futuristic possibility in Canada at this time.

FOOTNOTES

1. Branching Out, Report of the Canadian Computer/Communications Task Force, Department of Communications, Canada, 1972, at p. 54, Vol. II.
2. For a discussion of the operation of these automatic clearing houses in the United States see Binhammer, Deposit-Taking Institutions: Innovation and the Process of Change, Economic Council of Canada, pp. 121-123.
3. See Bank Marketing Association, A Study of Consumer Attitudes on Automatic Pay Deposit, Automatic Bill Paying, Consolidated Statements, Chicago, 1973.
4. For example, the Bank of Nova Scotia and Data Limited Created Telaccount Limited.
5. For a fuller explanation see *supra* note 2, at pp. 84-88.
6. Federally-Regulated Carriers and Chartered Banks: Participation in Commercial Data-Processing; Department of Finance and Department of Communications, Ottawa, January 16, 1975 (mimeo).
7. Bank Act R.S.C. 1970, c. B-1
8. In the United States there are variations of this system in wide spread use. Some banks have personal bill paying plans. These plans involve a bank customer listing on a document all the firms and amounts to whom he regularly makes payments. When the document is signed and given to the bank the accounts are then paid by the bank.
Another variation is the "bill-cheque". The merchant sends the customer a bill-cheque which the customer signs and returns to the merchant. The entry is put on tape by the merchant and given to the bank in that form. The bank then affects payment. For a lengthy discussion of these techniques see *supra* note 2, pp. 123-124.
9. See page 6 of this study.

FOOTNOTES - cont'd.

10. Perhaps one of the reasons that telephone bill paying is growing in popularity is the dearth of American legislation regarding this system.
11. For further information on the American situation, see Dollar Savings Bank, Pay-By-Phone (Pittsburgh: Dollar Savings Banks, 1978) and the Money Service, "TMS Introduces Bill Paying," Executive Update, Vol. XI, August, 1977: 1-2.
12. See the Telecommunication Study
13. Information taken from supra, note 2 pp. 90-93.
14. For an interesting discussion of why this institution took this innovative study and how it got substantial support from IBM see supra, note 2 p. 91.
15. For discussion of the various kinds of hardware involved in developing electronic funds transfer refer to the EFTS Technology Study.
16. Supra note 2 p. 94.
17. See, "Docutel Postpones Manufacturing, Marketing of TT200 ATM" 9 PSI Newsletter for October 1977 p. 8. (Published by Payments Systems, Inc.).
18. See, "The New Age of Terminals", Canadian Datasystems, June 1975, pp. 38-42.
19. Supra, note 2, p. 95-99.
20. "The Branch of the Future" John D. McLean a computer application expert from Peat Marwick Consultants, See, "Four-Tier Structure on the Way for Banking" Globe & Mail Report on Business, November 19, 1977, p. B5.
21. For a discussion of the events leading up to the Canadian Chartered banks deciding to join the Bank American System rather than produce an indigenous card, See, note 2 supra at p. 103-108.
22. Loan and Trust Corporations Act, R.S.O. 1970, c. 254
23. R.S.C., 1970, c. s - 11.

24. Information taken from McInnes, Credit Cards a Canadian Overview, Legal Research Institute of the University of Manitoba, p. 35 - 36 (1974).
25. In August 1977, in the United States Visa announced plans to process Master Charge transactions and permit use of the O.K. mark on Master Charge cards. Interbank then voted to prohibit Master Charge members from using Visa's systems and Visa members from using Interbank's systems. The obvious issue is whether the card systems will merge or remain as two autonomous independent systems. For a complete discussion see, "Hock Predicts Interbank's Ban against Use of Visa Systems will be Tested", 9 P.S.I. Newsletter, October, 1977, p. 1, Payment Systems, Inc.

